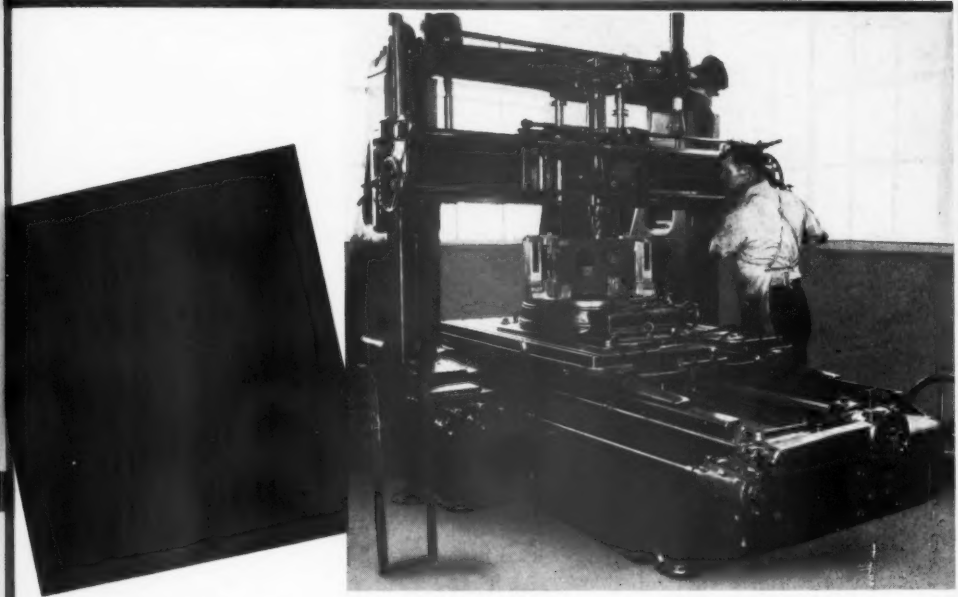
TOOL DIE MACHINE
PROGRESS
THE NATIONAL TOOL AND DIE JOURNAL

TOOLS, DIES, JIGS, FIXTURES, MOULDS, GAGES, MACHINES
Design and Engineering
PRECISION SPECIALTIES
STAMPING and PARTS PRODUCTION
Official Publication
Special Tool, Die & Machine Shop Industry

NOVEMBER, 1938 • CIRCULATION MORE THAN 12,000



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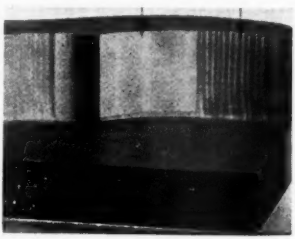

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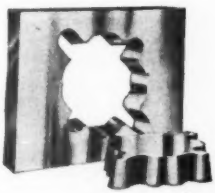

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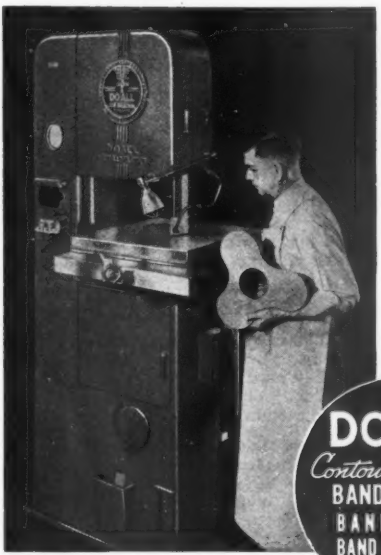

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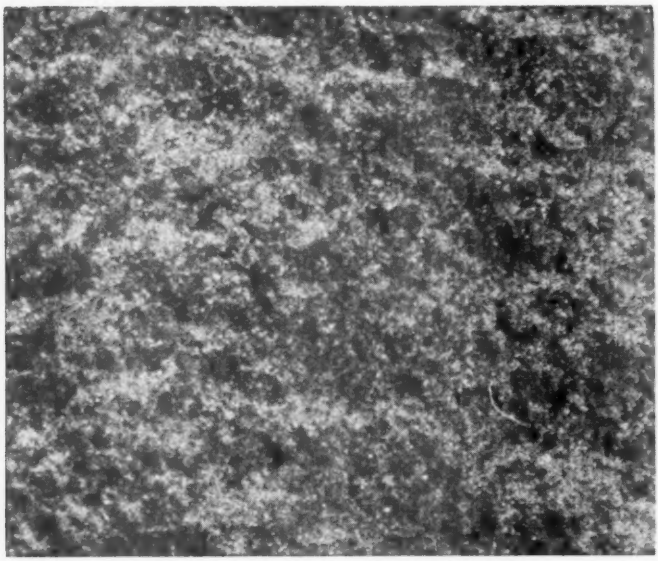

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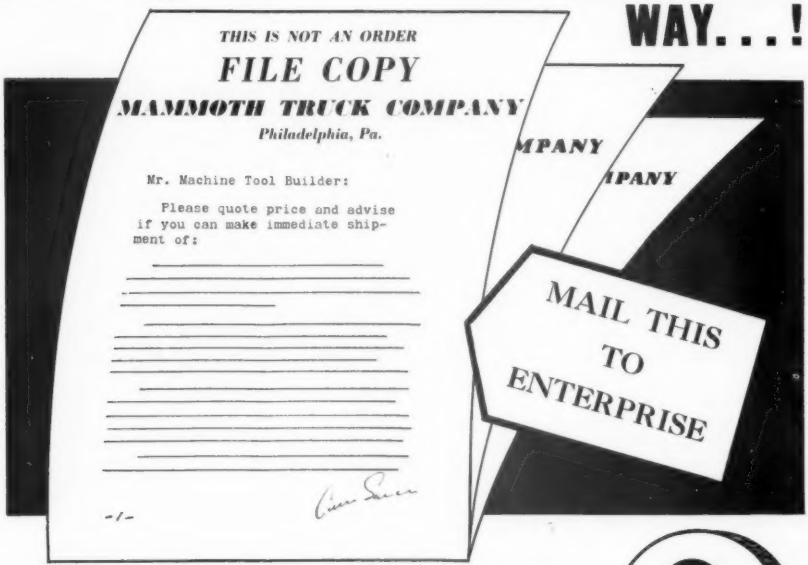
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Tool • Die • Machine **PROGRESS**

The National Tool and Die Journal

November, 1938 Vol. 4, No. 8

New Telephoto Trans-ceiver, A Marvel of Invention and of Manufacturing Precision

• • •

By F. W. Denning

The Denning Manufacturing Company

• • •

TRANSMISSION of photographs by wire is in its entirety a very recent accomplishment. There has been improvement since those first indistinct and often distorted images appeared in our newspapers but now the process has been advanced spectacularly by an outstanding development.

L. A. Thompson, chief engineer of Acme News Pictures, Inc., of Cleveland, Ohio, has developed an instrument which has within itself both the transmitting and the receiving units for the wire transmission of photographs. In comparison with much of the equipment now in use, the new Acme Telephoto Transceiver is a diminutive machine. Hardly the size of a typewriter, with its dials and controls it has at first glance the appearance of a radio receiving set. When the case is opened, however, the impression is that it resembles one of the early types of phonographs, there being a drum not unlike the old record cylinder.

This compact little machine, enclosed in its lacquer finished case, weighs only 28 pounds and measures not more than 14 inches in length and 8 inches in height and breadth. Compare with this the present type of picture transmission equipment which takes up most of a good sized room, stands almost 6 feet high and weighs more than one-half ton. This new Telephoto Trans-ceiver developed by Mr. Thompson and his technicians will, for several reasons, make great changes in photo transmitting. It will not be necessary any longer to rush photographs by aeroplane to distant cities where the present elaborate equip ment is in operation because this new compact, little instrument can be taken directly to the scene of the event. It is only necessary to make connection into a telephone line and in less than ten minutes several thousand miles away there can be reproduced in identical machines the pictured stories of news events.

The cost of producing this new machine is so much less than the former elaborate equipment that newspapers everywhere will be able to afford and install it. Machines which have been built up to this time indicate the possibility of production at a cost of approximately one-tenth.

When a photograph is to be transmitted, it is clamped tightly around the

small drum previously described. A tiny beam of light is directed against the photograph and it successively glows upon each one-hundredth of a square inch without ever repeating. As each minute portion of the surface of the picture comes under the light beam the reflection is picked up by a photo electric cell. Every minute variation in the black and white shadings of the images in the photograph is recognized by this sensitive photo electric cell, amplified and then transmitted in the form of electric impulses over the telephone wire. In the instrument which is receiving at the other end the process is reversed, the fluctuating impulses varying the intensity of a tiny light beam. This is focussed on a photographic film or negative. The incoming electric current, fluctuating according to the impulses from the sending end are thus converted into light impulses of varying intensities and gradually there builds up on the negative a series of black and white and opaque spots which, when the film is developed, become an exact reproduction of the original photograph which has been transmitted.

The distortion which is frequently noticed in wire-photos has been practically eliminated by Mr. Thompson in the new Acme Trans-ceiver. This alone is an outstanding achievement in this comparatively new art. Distorted images are largely the result of variations in electric current in different cities and towns. To overcome this a generator considerably smaller than the Trans-ceiver and weighing about 30 pounds is used with it. The generator makes use of the tuning fork principle, in other words, the electric power in the city from which a Telephoto is to be transmitted causes the tuning fork to vibrate according to a certain frequency. By

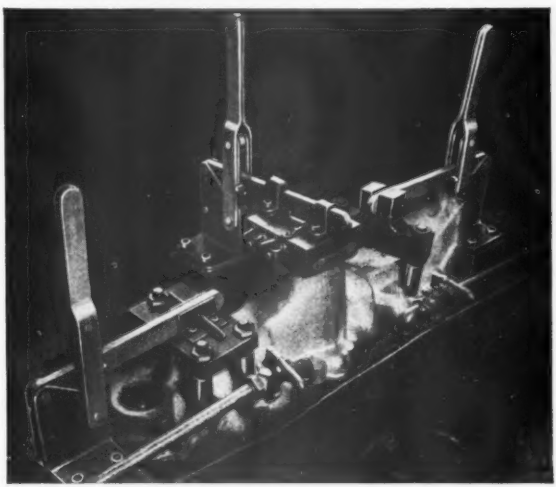
L. A. Thompson, the inventor, making final electrical test of an Acme Telephoto Trans-ceiver before placing it in service.

setting all of the tuning forks in the various receiving sets to the same vibrations the operation of all Telephoto Trans-ceivers will be accurately syncronized.

This amazing new mechanical device which has already been designated as a "miracle" machine is comparable with the finest precision-built instruments. It is the ingenious design of operating units and parts by Mr. Thompson that has made its compactness possible. Clearance between moving parts is generally 1/64 of an inch and specifications therefore call for very accurate machining. Even the cover which is in two parts, both hinged, must exclude all light when closed. When one gives consideration to the fact that inside of the machine's base provision has been made for transformers, condensers and literally miles of wire, its interesting construction will be appreciated.

Two synchronous motors of 1/1500 horse power are used. One drives the drum upon which the film is revolved; the other serves to drive the optical unit by means of a hardened, ground and lapped lead screw which assures continuous travel over a space of 8 inches. Lapped ball races insure free and uniform motion of the optical unit carrier. The carrier bar is likewise lapped and ground. The drum upon which the film is revolved must be accurately balanced. It is coated with a chemical and then a paint—both of them special formulas. The drum contains a unique clamping device to hold the film tightly in place. To insure the smoothest possible operation, gears are made of fine texture linen bakelite with metal hubs while the worms are made in one piece with shafts hardened, ground and lapped. A specially designed ultra-sensitive clutch which compensates for even the slightest oscillation of the motor shaft is used. Because perfect motion of driven parts is vitally essential for successful operation of the Trans-ceiver, continuous checking is necessary. This is done by means of a Strobotac and other electrical testing apparatus. All cast parts are made of Dowmetal to reduce weight. Many special tools had to be designed and built to machine some of the parts of the Trans-ceivers and tuning forks already built and those now in the course of construction.

Scientists, engineers and technical men who have had the opportunity of inspecting Mr. Thompson's "miracle" machine have been liberal in their commendation and have predicted extraordinary success for it.



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Die Designing and Estimating

By CHARLES BOHMER

This tenth article continues the series on "Tool Designing and Estimating" as this subject is being taught to Tool and Die Shop apprentices under the auspices of the Chicago District of the Tool·Die·Machine Shop Institute in the Carl Schurz High School. The author, Charles Bohmer, tool superintendent of the Federal Tool Corporation, is one of the class instructors.

Side or Cam Action Dies

THIS type of die, although not extensively used, plays a very important part in the production of shells, particularly in side piercing or trimming. The construction is very compact and side operations are performed in one complete stroke, thus eliminating several dies and separate handlings of the part. This results in substantial savings both in tool cost and production. However, this style of die is comparatively expensive and unless the production is of such quantity as to warrant this construction, it is more economical to use the horn type of die for the various operations.

The component parts of the unit are:

The Die
The Punches
The Punch Guides or Retainers
The Strippers
The Hold Down
The Cams

THE DIE

The die is the central part of the construction and is made entirely of hardened tool steel or of machine steel with hardened inserts. As will be noted in the illustration the die also acts as a gauge, being accurately fitted to the inside of the part with the sides of the shell fitted snugly against the die to prevent distortion as it is pierced. The size, shape and number of openings vary according to part specifications and must be machined accordingly. Definite location from the ends is accomplished by either resting the shell against the top or by means of lower rest pins that gauge the blank from the bottom or edges on the down or open side.

To clear the openings of slugs or scrap they are led into a center cavity and dropped through the shoe, however, where there are a great number of perforations the slug may be led into individual channels and thus cleared. When locating or providing the mounting holes, consideration must be given to this point of avoiding interference from the slug clearance hole to prevent possible damage to either punch or die.

THE PUNCHES

The punches must necessarily be of the specified size or shape as in any other piercing arrangement and of the conventional style depending upon the construction of retainment. If direct insertion is desired the perforators will be of the straight body type held in by means of a pin or set screw. If an in-

dividual pad is used the perforators will be of the head variety and provisions made for mounting of the assembly. In some cases where the punch may be large and of irregular shape, the base or flange construction may be used and mounting done by means of screws and dowels or a round shank may be turned on the punch and fitted to the retainer and held in position the same as the straight round body type. However, precaution must be taken to prevent turning or mislocation of the punch, which can usually be accomplished by means of gauging flat on the shank.

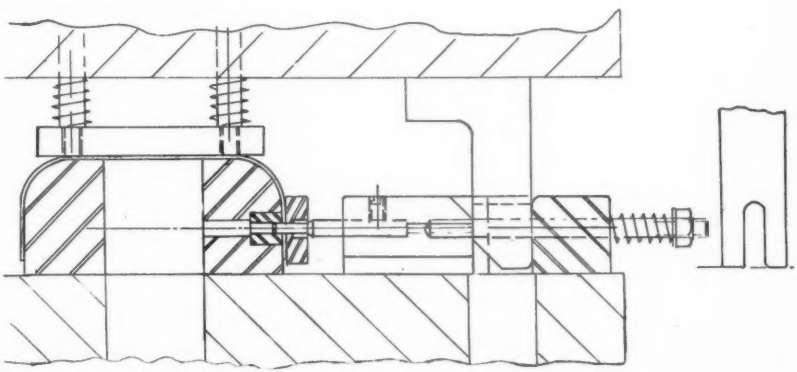
THE PUNCH GUIDES OR RETAINERS

These parts must be very accurately made for they determine the lineup between punch and die. Their construction may vary in style but fundamentally it is the same: i.e., close guidance to assure uniform movement, with outside play or vertical clearance to assure accurate entry of punch into die.

The two styles generally used are those illustrated, one of which is the slide and gib construction, the other, the hole and pin type. In the gib construction the slide travels along the shoe, being held in position by the gibs with enough clearance to permit movement. The material used is usually machine steel which is case- or pack-hardened to assure long life. It should be ground at all points of contact. If the punches are inserted directly, it is advisable to remove the case from the front and bore after the unit is complete. This helps to prevent inaccuracy due to heat treatment. It also should be done if the pad and punch construction is used, because removing the case allows mounting in any position required, eliminating the necessity for providing mounting holes before hardening and then later transferring them into the pad. For smooth action and minimum wear the rear of the slide is tapered to match the cam.

To withdraw the retainer, a spring and stud are used, being fastened to the rear of the slide and leading through a thrust plate. The stud is threaded on the ends—one for fastening purposes, the other for the thrust nut. The spring is of the push type and fitted over the stud against the thrust plate and held in position by the nut. As the slide moves in, the spring compresses and upon release forces the slide back into its normal position which should be determined by some definite stop arrangement.

The pin and hole type is constructed with a hardened retainer block which has a bored and lapped, or ground hole and is permanently fastened. The slide is round, fitted accurately to the hole and may be the punch itself or have the perforator mounted on it. The guide



SLIDE & GIB

hole in the retainer is bored larger in the back to accommodate the spring and head or thrust end of the slide. The slide is rounded at the end where it contacts the cam and must be inserted from the rear. The spring is fitted around the slide and stops against the retainer and head. The cam enters through a cross opening, forcing the unit forward and upon release the spring brings it back into position. Necessary provisions must be made to prevent the slide from coming out and also to keep it in proper location relative to the cam. In piercing a series of holes in a round shell, the retainer block may be one complete unit such as a ring with the guide holes properly located. This saves considerable time in construction because it eliminates individual mounting.

THE STRIPPERS

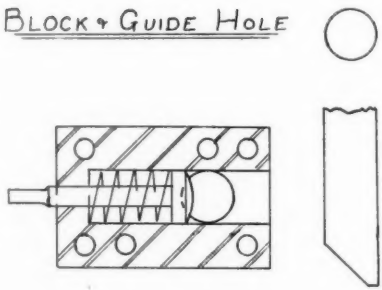
Depending upon the thickness of material or strength of shell, strippers may or may not be a necessity. If the shell is strong enough and since it completely covers the die it is self stripping, however, if this condition does not exist, a solid or spring stripper may be used. The solid type should be fastened securely to the shoe at a little more than material thickness away from the die to permit loading and the spring type fastened to the slide with the conventional spring stripper construction.

THE HOLD DOWN

This is nothing but a spring pad mounted on the punch holder directly over the die for the purpose of holding the blank down against the die or end gauge before the punches operate and thus eliminating possible error or variation of hole locations.

THE CAMS

Their purpose is to actuate the slides on the down stroke of the press. The construction varies according to the style of slide, some being round pins with tapered ends and others being square or rectangular. They are mounted to the punch holder the same



as a punch might be fastened with particular consideration given to the location, amount of taper and width that determines the slide movement and the possibility of a back support to prevent them from giving away or moving because of the extreme pressure sometimes required to move the slide and perforate. In the hole and pin construction where the cam enters through a cross opening it is self-supported and needs no backing but in the slide and gib type the cam is in the open and very often requires the backing accomplished by mounting a block securely on the shoe in such position that it will heel or support the cam. This backing block may in some cases also act as the thrust for the spring and stud. An important point of construction in the cam of the slide and gib style is that of providing clearance for the stud as is shown in the illustration.

The various parts which constitute the complete unit cannot be made according to any definite or conventional ruling, rather they must be constructed to solve the problems at hand. However, the principles involved in construction seldom vary and when combined with accurate workmanship side action or cam dies should work to the satisfaction of all concerned.

Hamilton, Ohio

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Designers and Builders of
Tools, Dies, Jigs, Fixtures, Special Machinery
The Hamilton Portable Elevating Table

Advancement In Boring Tools

• • •

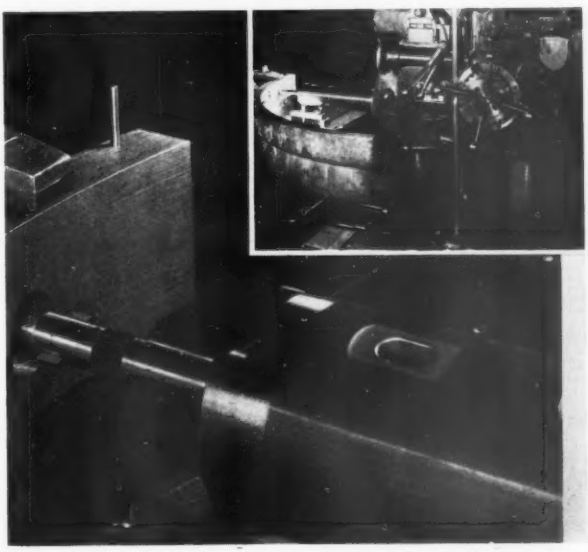
By R. G. Michell, General Manager

Eclipse Counterbore Company

• • •

MODERN industry is insistent in its demands for ever higher degrees of manufacturing accuracy. New models come before us each year, the products of more advanced precision, until today we correct surface irregularities so that they may be measured in millionths of an inch, which is just about the vanishing point for even a scratch. (See article on Superfinishing, October Tool·Die·Machine PROGRESS.)

Such marvelous progress in manufacturing accuracy can be the result only of similar machine and tool development. Thus we have from the tool room and the die and mold shop a continually increasing demand for such precision equipment as the jig boring machine and the horizontal types of boring and drilling machines. Even drill presses today are built to perform with a degree of accuracy hardly thought necessary a comparatively few years ago. For the production plant there have been developed high speed production boring machines (often referred to as diamond



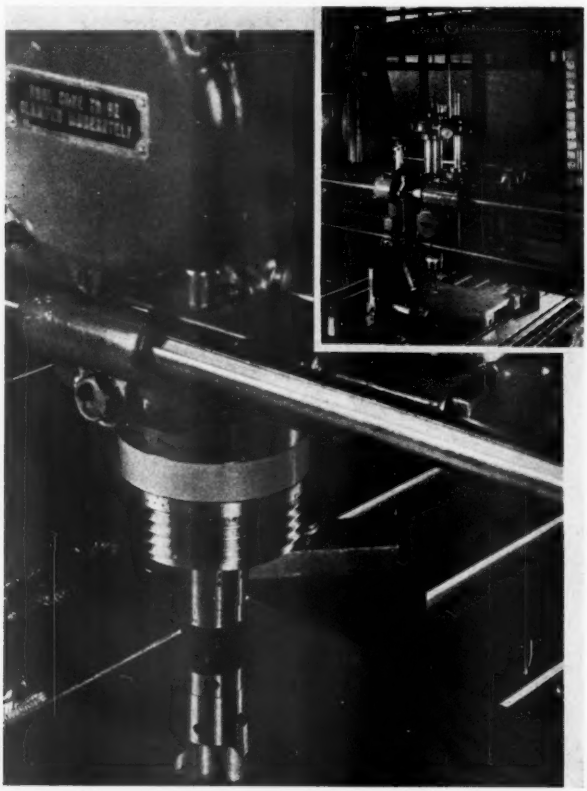
Eclipse MIKRO-LOK Boring Bar with self-locking blades micromatically adjustable in increments of .0005", in use on a Horizontal Boring Mill. Simplicity of design and ease of adjustment assure unusual efficiency.

boring machines) with hole-boring accuracy to an exceedingly close tolerance. Cemented carbides are a comparatively recent cutting tool material particularly effective for removing stock at very high speeds.

It is natural that such advancement in hole-boring should bring its demand also for better hole-finishing. Fundamental requirements of such tools are maximum rigidity and cutting ability, quick blade adjustment and a locking device easily operated and absolutely positive.

The new line of MIKRO-LOK boring tools described here for the first time has been developed for both jig and production boring. They are a development of Wm. Kyle Young, Chairman of the Standards Committee of Rockford Chapter Society of Tool Engineers, who recently became associated with the Eclipse Counterbore Company, Detroit, as Manager of their Boring Bar Division.

These MIKRO-LOK boring tools have a rugged built-in mechanism. Adjustment is by a micrometer dial arrangement which permits quick, accurate adjustment of the cutting blade or blades to blueprint specifications. This entirely enclosed construction consists of an internal feed bar, controlled in longitudinal movement by accurately ground threads in a micrometer dial sleeve, actuating travel of the various cutters mounted in the bar proper. Minimum diameters not heretofore attainable in a precision adjustment hole-finishing tool are made possible. The blades are self locking and they are the only projection from the bar proper. This self



Precision Boring with MIKRO-LOK Jig Boring Tool, adjustable on the job in increments of .00025". The blade is the only projection from the bar.

locking feature substantially reduces the time required for setting. With the elimination of other projections there is a minimizing of chip and other foreign accumulations.

When the useful life of most MIKRO-LOK blades has been exhausted for their original bar sizes, further life in the next smaller sized bars is readily obtainable by simple alterations.

Several types of these Eclipse boring tools with MIKRO-LOK adjustment are available:

Jig boring tools in sizes for boring holes from ¾" to 4" in diameter, and high speed precision boring tools (for diamond boring machines) for hole size as small as .500". These are adjustable in increments of .00025".

Two-bladed floating blade boring bars for accurate hole-finishing in production work, in place of floating reamers. Adjustable in increments of .0005". Six MIKRO-LOK Floating Blade Reaming Bars cover a range of 1¼" to 4½" diameters.

For job and small production shops six sizes of MIKRO-LOK Bars with fixed blades will bore diameters 1¼" to 4½". Adjustable in increments of .001".

Automatic feed-out type tools for recessing and undercutting otherwise inaccessible surfaces, and bars having piloting sections both above and below the work, combining two or more cutting blades in tandem or independently distributed on the bar for multiple-diameter line boring.

More detailed descriptions and specifications of the new line of MIKRO-LOK boring tools may be had by writing for bulletin CL to the Eclipse Counterbore Company, 7428 St. Aubin Avenue, Detroit, Michigan.

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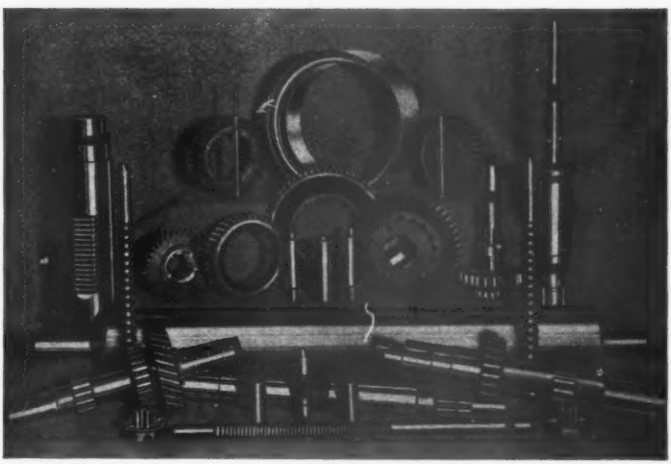

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Large Automatic Stamping Production Results from Unique Design of Dieing Machine

• • •

THE Henry and Wright Dieing Machine is a precision high production press designed primarily for automatic stamping operation, differing radically from all other punch presses. Flywheel, crankshaft and connection are all below the punchholder instead of above. It also employs these four scientific principles: A low center of gravity, allowing high speed with minimum vibration. A maximum guiding surface, including a four-post guide to punchholder, thus insuring perfect and constant alignment. A pulling stroke applied to the die instead of the usual pushing stroke found in the ordinary press. Upper crosshead which is required to take only the pressure necessary to perform the work in the dies.

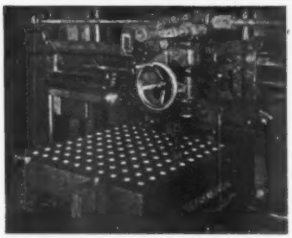
Work in process is readily accessible and visible to the operator at all times. All working parts, except the tools and punch-carrying member, are enclosed in a cabinet-like base, free from access by dirt or unwary fingers. Equipped with a roll feed and progressive dies, the dieing machine is a high production tool whose permanently perfect alignment makes it possible for dies to operate satisfactorily at higher than normal speeds.

Despite these high speeds at which the dieing machine is operated, substantial increases in die life and number of pieces produced between grinds are obtained with its use. This is due to any angular thrust from the crankshaft being absorbed by the lower crosshead instead of being transmitted directly to the punch-carrying member, as would result in an ordinary press, and to the upper crosshead, or punch-carrying member, which is actuated by four guide rods under tension only being in perfect alignment at all times.

The machine is available in seven standard sizes ranging in capacity from 10 tons to 150 tons. Typical operations include the production of two condenser plates per stroke at 310 strokes per minute; one stator and one rotor lamination for an electric motor at the rate of 150 of each per minute; and a brake flange produced from 11-gauge hot rolled steel in coils at the rate of 85 per minute. Operating speeds of Dieing Machines in standard models range up to 350 strokes per minute, special Dieing Machines being available for operation at speeds up to 700 strokes per minute.

The die bed of the machine is of rugged design and ample thickness to withstand all stresses to which it may be subjected. The upper crosshead occupying the same position as the punchholder in a conventional press is also substantially built and designed to provide the required strength. A chute is attached under the die bed so that stampings can pass to the outside of the machine into containers. The crankshaft is a hammered forging made from 40% carbon alloy steel, annealed, rough turned and ground. The crankshaft bearings are made from special hard bronze and are scraped to a perfect fit. The guide rods which connect the upper and lower crossheads and move vertically with each stroke of the machine are produced from chrome-nickel steel and are shouldered in castings at either end where they are held firmly. Guide rod bushings are scraped to a perfect fit and to allow for wear are tapered and adjustable in tapered seats in the bed.

The patented Henry & Wright roll feeds are mounted in substantially proportioned frames located at each side of



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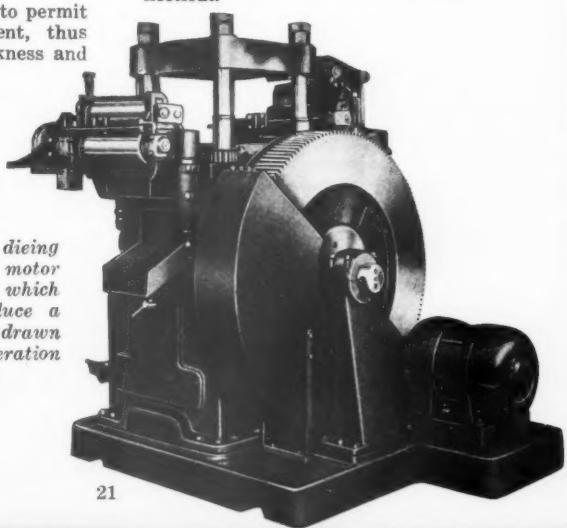
the machine, these rolls being ground to extremely close limits in order to provide perfect synchronization with other parts of the machine. The rolls which are large to assure a positive and accurate feed, are actuated by a ratchet and pawl mechanism located at the end of the lower roll shaft. Each pawl holder contains 8 pawls in feeds for machines ranging from 10 to 50 tons and 14 pawls in feeds for machines of larger capacity. This divides the circular pitch of the ratchet tooth into 8 or 14 parts, thus permitting a very close adjustment. Steel gears are keyed to pawl holders and mesh with actuating rack, this rack being supported by rolls mounted on eccentric studs. The rack is reciprocated by a large feed lever driven by an adjustable crank at the end of the crankshaft. Various lengths of feed are obtainable by adjusting crank to or from center. Stock is guided by rolls which relieve dragging action on material, these rolls being adjustable for various widths of material.

Feed frames are constructed to permit independent vertical adjustment, thus caring for dies of various thickness and maintaining feedline at proper elevation. Feed frames may be swung upon 120° to allow free access.

The machines vary in capacity to meet a greatly diversified number of products. The 10-ton dieing machine is being used extensively by manufacturers of electrical equipment, razor blades, envelope clasps, and other small metal parts because of its high speed and relatively low cost; while on the 150-ton dieing machine radio chassis, automobile clutch discs and fingers, heavy hardware, electric range units, transformer laminations and agricultural implements indicate the wide range of products.

Many large manufacturing plants use substantial numbers of these dieing machines, but even a single unit will prove its value in small plants and contract shops.

Additional information is available and may be had upon request for Catalog TD. Write The Henry & Wright Mfg. Co., Hartford, Connecticut.



A 50-ton Henry & Wright dieing machine with direct connected motor drive and automatic roll feed, which is especially adapted to produce a large variety of formed and drawn parts complete in a single operation in multiple-station dies.

S & H Universal Spring Coiler Reduces Set-Up Time

SET-UP time is an item of disproportionate expense in many machine operations. Not only is there the cost of the labor directly employed but also the non-productive period of the machine. Long runs of course distribute the expense involved in setting-up a job or tooling a machine over a longer period of time and a larger output but generally speaking the production man looks with favor upon any effort which is made to design equipment to minimize such loss of time.

Such an effort has been made by Sleeper & Hartley, Inc., in the design of its new Universal Segment Type Spring Coiling Machine. This company's own experience in the building of wire working machinery and wire mill equipment has enabled it to present a coiler which is both unique in operation and highly efficient.

An outstanding feature is the method of adjustment for the pitch and diameter. In a recess on the front side (covered by a hinged door) are located the cam controls whose accessibility is in contrast with the previous inside location. When it is necessary to make a change or adjust for a special spring, both pitch and diameter cams may be shaped, timed and affixed to the cam hub which, as an entire single unit, may be removed from the shaft. One-piece solid cams may be used on this removable cam-hub.

Other convenient controls include: Individual pressure for each pair of feed rolls; individual, simple adjustment for cutter alignment instantly adjusted from upper to lower cutter shaft; micrometer adjustment of compound blocks; pitch-stop conveniently located and quickly adjustable.

The new machine will coil and cut all kinds of compression and extension springs including: Open and close-coiled springs; right and left hand springs tapered one or both ends; two-diameter springs; coned springs with any degree of taper; coned springs with variable pitch; barrel-shaped springs. Increased capacity is indicated in the handling of .080" diameter music or oil tempered spring wire to a maximum wire length per spring of 48". The machine may be equipped with a compound gearing for a 96" feed for use on wire of .041" diameter or smaller.

A new illustrated circular describing the unique design of this spring coiling machine may be had by writing to Department CL, Sleeper & Hartley, Inc., Worcester, Mass.

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When you order or write about products described in TDM PROGRESS please mention the publication.

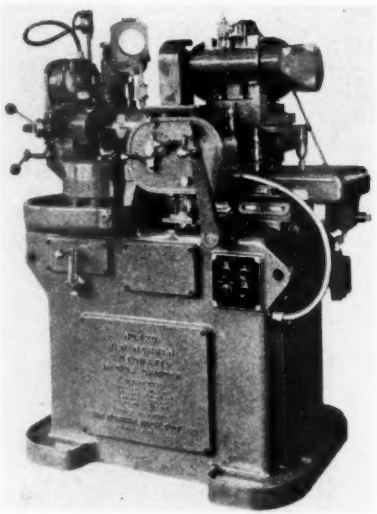
New Automatic Internal Radius Grinder by Van Norman

THE new Model 120 Van Norman Radius Grinder is designed to provide the most efficient method for grinding raceways of the smallest ball-bearing outer rings and will effectively grind up to and including 204 size (approximately 1⅞" diameter). The aviation, instrument, electrical and automotive industries are particularly interested, although this machine will find many instances where it will fit into the requirements of other industries. When small diameters must be spherically ground, standard machines are frequently too large and cumbersome. The Van Norman Machine Tool Company have been making oscillating radius grinders for 20 years and this No. 120 size embodies proven engineering features developed during that time. Every part is designed and built to assure the vibrationless operation which is essential to perfect spherical grinding.

The oscillating bearing is the company's latest design of 3-point contact ball bearing which provides an extraordinary degree of rigidity. A crank drive provides smooth movement of the oscillating units while simple mechanical means are used to actuate all slide movement.

Most of the machine's function is automatic. After being started by a finger-touch lever the wheel moves into grinding position automatically and coincidentally it is also retracted to compensate for stock removal. The workhead automatically starts rotating and oscillating as the wheel feeds automatically into the work. When a race is ground to size, the wheel automatically moves to unloading position until the workhead stops. Simple standardized electrical controls are used for the complete grinding cycle function.

Electric gaging is not satisfactory for very small sizes therefore the No. 120 is equipped with an electric control on the feed drum which brings the slide



automatically to unloading position when the wheel has been fed to the point of proper size. The machine is arranged for electric gaging of larger sizes of races. Because high workhead speeds are required the No. 120 has a motorized workhead delivering 2,000 RPM to the workhead spindle, and rigidity far in excess of machine capacity. Wheel spindle operates up to 40,000 RPM, driven by a 3 HP motor belted to a ball-bearing jackshaft belted in turn to the wheel spindle. Drive unit is mounted directly on the wheel slide. Every feature of the No. 120 contributes directly to the highest degree of finish, accuracy and production.

Descriptive matter for those interested in this new internal radius grinder will be available and may be had by writing Van Norman Machine Tool Co., Dept. PR, 156 Wilbraham Avenue, Springfield, Mass.

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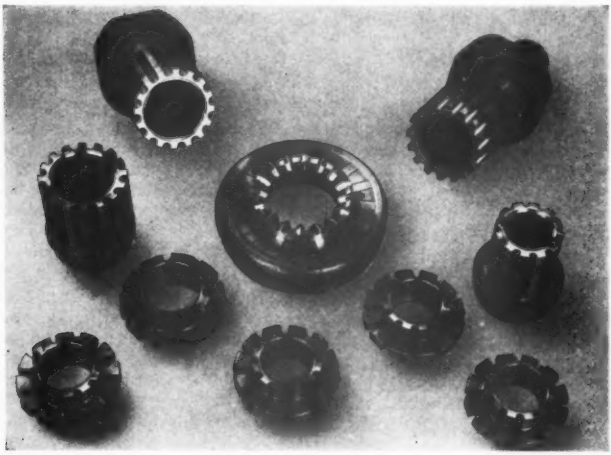

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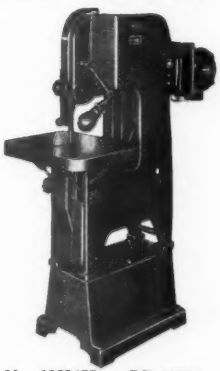

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Diamonds In The Tool Room

THE supreme hardness of the diamond accounts for its being an indispensable adjunct to abrasive wheels used in precision grinding.

As they come from the mines, diamonds in their rough state present an extensive variety of shapes and quality of structure and they range from black or opaque to clear crystal. The crystals are cut into gems for the jewelry trade while those not suitable for that purpose become known commercially as either "Carbons" or "Bortz" and when they find their way into the industrial plants, all are known as industrial diamonds.

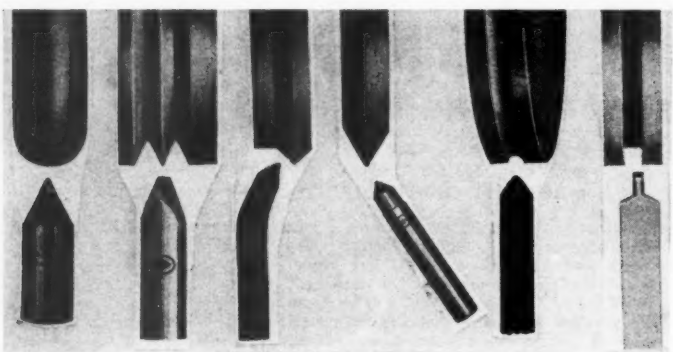
Diamonds come to us from South Africa and Brazil. They may be Crystals or Octahedrons, Natural Points or Elongated Stones, and Ballas which are almost round in shape. Octahedrons are the most commonly known and widely used type, probably because of their eight-sided form.

In contrast to the Octahedrons, Natural Points are long and narrow diamonds. They are frequently preferred for grinding operations because the diamond cannot wear into a broad flat—remaining sharp enough for general purposes. Likewise, it extends well into the steel and thus it is secure in its setting and does not need to be reset.

Among the most interesting and efficient truing tools in which diamonds are used are Needlepoint Diamonds, sometimes called Phonopoints. They are made with a sliver of a diamond extending well into the tool and will always cut sharply until entirely used. They are ideal tools for truing small or fine grained wheels which require frequent renewal of cutting surface. Sixty-degree and 75-degree points are for very delicate work; 90-degree and 120-degree points are recommended where a broader, stronger tip is more desirable.

Another interesting group of diamond tools are those which true wheels specially formed for the grinding of punches, dies, form-milling cutters and broaches. The illustration herewith shows a number of them, in some instances the diamond being cut to form whereas in others they are the natural shapes best adapted to the purpose.

As with all tools, there is a right and a wrong way to handle a diamond truing tool. It should be remembered that most



A *B* *C* *D* *E* *F*

A—Chisel edge or conical point for radius forming. B—V-shaped diamonds for truing grooves. C—Selected diamonds for special stepped wheels. D—Fine edge wheels require needle point diamonds. E—For accurately formed angles and radii. F—For truing sides and depth of groove.

grinding wheels are bonded to resist breaking down; therefore, only a small amount of material, about .001 inch, should be removed from the surface at any one time by a diamond. To cut deeper than this or feed across the wheel too quickly has a tendency to generate a high degree of heat which can be very injurious to the diamond.

This interesting data has been furnished us by F. F. Gilmore & Company, 110 Dartmouth Street, Boston, Massachusetts, importers of rough diamonds and makers of diamond tools. A catalog with illustrations and valuable data may be had upon request and the mention of Tool·Die·Machine PROGRESS.

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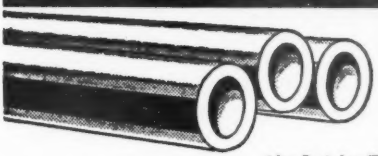

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New Appointments In Carborundum Family

FRANK J. TONE, president of The Carborundum Company, Niagara Falls, New York, announces appointment by the Board of Directors of Charles Knupfer and Henry P. Kirchner as vice-presidents. Arthur Batts, secretary of the company, and Mr. Knupfer are appointed members of the Board also.

Charles Knupfer was educated at the University of Rochester and joined The Carborundum Family in 1907. He was located in Düsseldorf, Germany, as a special sales representative until 1915 when he returned to this country and acted as district sales manager at Philadelphia. After the war he returned to Europe and his continental sales work. In 1936 he was recalled to Niagara Falls where he took over the duties as general sales manager.

Henry P. Kirchner was graduated from the University of Pennsylvania where he taught for a year, then came to Niagara Falls and entered the employ of the Niagara Falls Power Company. He joined The Carborundum Family in 1919 and in 1927 he was appointed works manager. Mr. Kirchner is a member of the American Institute of Electrical Engineers and has repeatedly served as a member of its committees on electrochemistry and electro-metallurgy. He is also a holder of many patents on abrasive products.

Arthur Batts joined The Carborundum Company in February 1901. For many years he worked directly under Frank Manley, treasurer, in the capacity of accountant. On June 1, 1920, he was appointed assistant secretary and office manager. In March 1927 he was appointed secretary, succeeding the late George R. Rayner, when he became vice-president.

"Modern Industrial Shops"

SHOPS of nationally known manufacturers and their use of South Bend Precision Lathes such as those in the photograph are illustrated in a new 32-page book just published. The book is entitled "Modern Industrial Shops," and is available to readers free of charge by writing the company and mentioning this magazine.

South Bend Lathes are used in a variety of industries and photographs show tool rooms and laboratory shops where the most exacting type of machine work is done as well as manufacturing departments in which precision accuracy and top speed are demanded.

Photographs are all of nationally known manufacturers and show installations as they actually are and operations as they are actually performed.

For a free copy of "Modern Industrial Shops," write the Technical Service Department TD, South Bend Lathe Works, South Bend, Indiana, mentioning this magazine.

This interesting display floor at the South Bend Lathe plant shows 68 sizes and types of precision lathes with 9" to 16" swing ranges and 3' to 12' bed lengths. There are tool room lathes, production lathes, lathes fitted with raising blocks for greater swing, as well as lathes with collet, grinding and milling attachments.

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Keep Shop Orderly...Find Stock Easily...*with this man-high*
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Of particular interest to die makers is a group of mill cut rotary files for use on drill presses. These are made of high carbon tool steel in two types: straight files for filing and finishing dies and templates ready for clearance, and clearance files for putting exact break clearance on punches and dies. This catalog is separate from the company's precision file catalog which lists more than 3500 shapes, sizes and cuts. The company's stock is carried in New York and amounts to some 50,000 dozen files.

Upon request to Department TD, Grobet File Corporation of America, 3 Park Place, New York, New York, the two catalogs mentioned in the foregoing article are available.

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Darwin & Milner, Inc., 1258-64 West Fourth Street, Cleveland, Ohio.
Wheelock-Lovejoy & Co., Inc., 130 Sidney St., Cambridge, Mass.
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Columbia Tool Steel Co., 410 East 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1258-64 West Fourth Street, Cleveland, Ohio.
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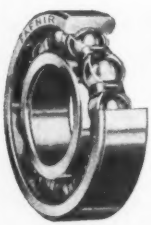

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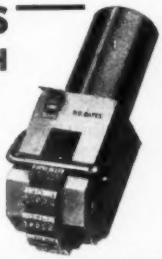

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History of Neor Steel

THE invention of Neor steel dates back more than 30 years and some of its early achievements were truly historical. Neor's resistance to abrasive action even today makes it stand out as an unusual steel. It is one of the hardest types of tool steel, weighing approximately 480 pounds per cubic foot as compared with 493 pounds for carbon and 543 pounds for high speed steels. One of the most interesting incidents in the use of Neor tools is that of a die which was being used for coin-pressing automobile connecting rods. It is reported that two pieces got into the press at the same time but the die made of Neor steel did not break. Instead the two pieces were coined on both sides and cold-welded solidly into the regular thickness of one. This was done under a pressure of 800 pounds and the rods were made of chrome-nickel steel.

A new folder of more than ordinary interest has been published by Darwin & Milner, Inc., describing Neor steel as the original non-deforming oil and air-hardening, high carbon-high chromium steel. The fact is emphasized that for the first time Neor made available a die and tool steel which could be designated as non-deforming and non-shrinking during the process of hardening.

The circular contains a technical description of Neor steel and instructions for machining, normalizing, hardening and tempering. Physical properties are set forth in detail and hardening and tempering curves are charted.

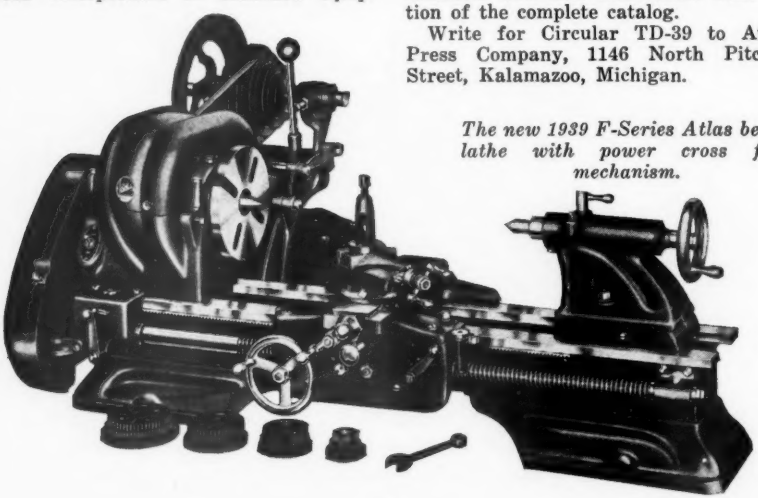
Readers of this publication may have a copy of the circular by requesting CL6 and addressing Darwin & Milner, Inc., 1258 West 4th Street, Cleveland, Ohio.

Preview of New Atlas Lathe With Power Cross Feed

A NEW 10-inch precision bench lathe with power cross feed is announced by the Atlas Press Company. It is said to be the first time this feature has ever been incorporated as standard equipment in a popular priced line of lathes.

A preview circular containing pictures and descriptions of all new 1939 machine tools and shop equipment is available now and will insure reservation of the complete catalog.

Write for Circular TD-39 to Atlas Press Company, 1146 North Pitcher Street, Kalamazoo, Michigan.



The new 1939 F-Series Atlas bench lathe with power cross feed mechanism.

Cleveland Small Shop Site For Sale

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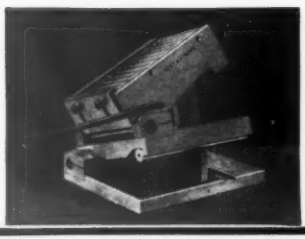
A model for every requirement.
Prices begin at $95.00

OMER E. ROBBINS CO., 637 Mt. Elliot, Detroit, Mich.



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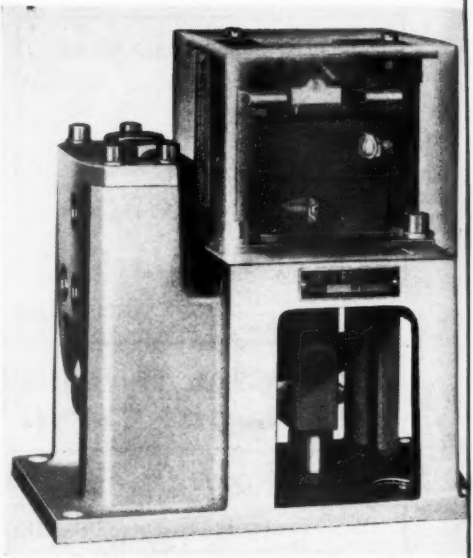
Ross Introduces Two New Solenoid Valves

THIS illustration is one of two new solenoid controlled Ross air valves especially designed and manufactured for high speed service. One of these units is for the control of single acting and the other for double acting cylinders. The poppet principle, which is employed in the Ross standard air valve line, is used in both of the new models. They are compactly designed and light in weight. The utilization of air line pressure for reversing the valve action is claimed by the manufacturer to be an unusual feature, the elimination of return springs making it possible to use smaller solenoids. The valve proper or the solenoid, is easily removed by loosening four bolts.

These new Ross air valves are particularly adapted to production operations such as high speed welding where unusual serviceability should be combined with easy interchangeability of parts. The design is simple, the construction sturdy.



For complete data, write the Ross Operating Valve Company, 6478 Epworth Boulevard, Detroit, Michigan, regarding Model TD191.

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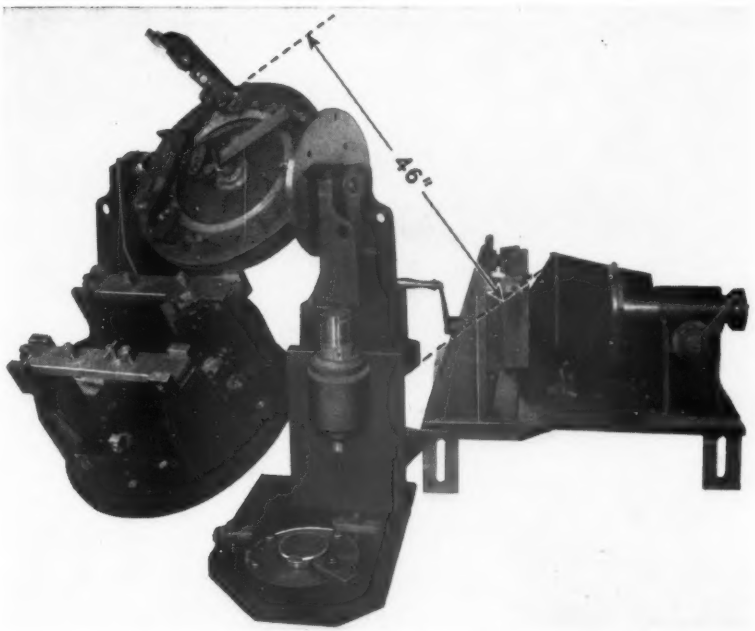

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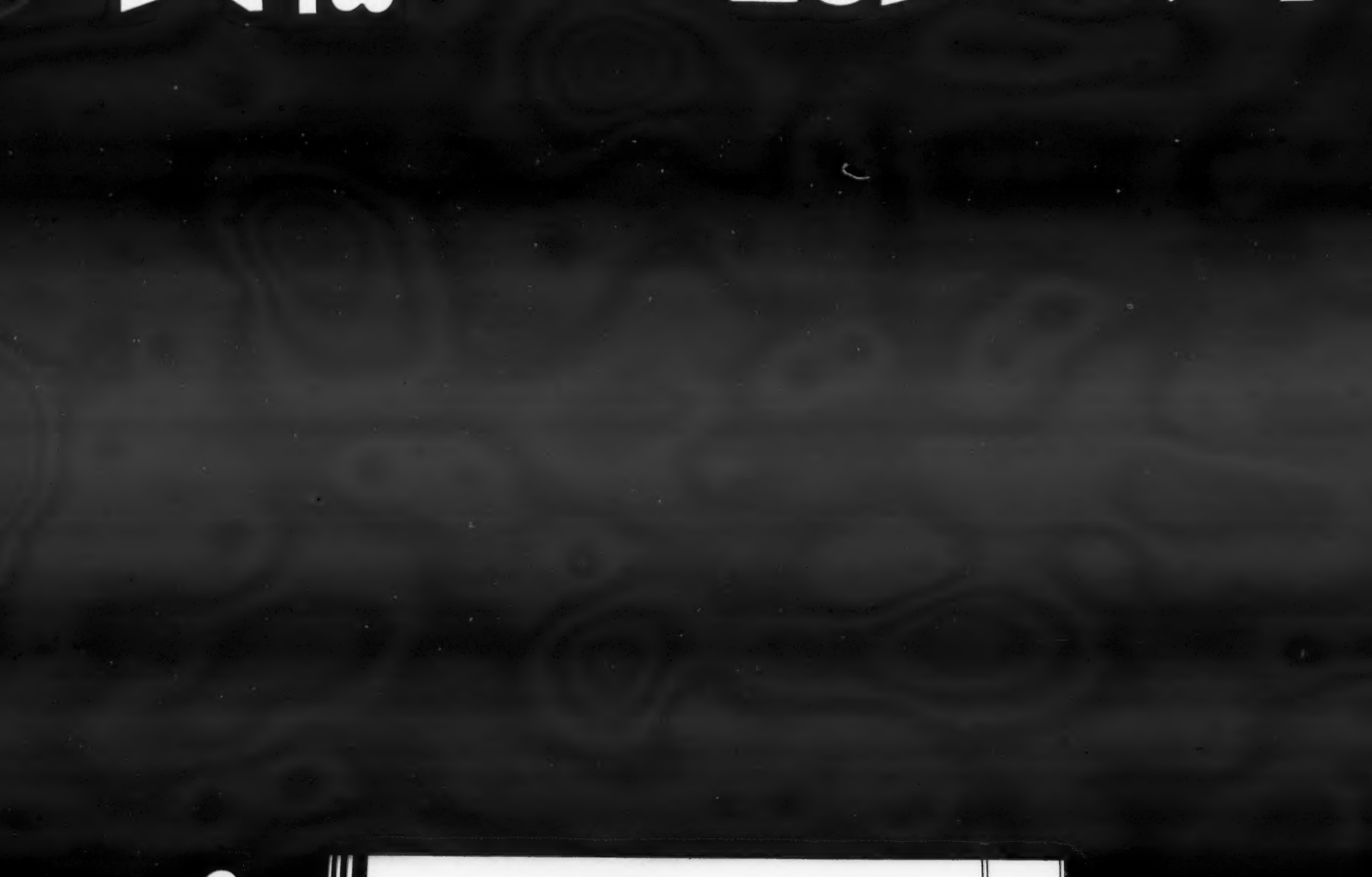
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